

WHAT IS CLAIMED IS:

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1. A method for electrochemically machining a tandem blisk comprising:
mounting said blisk in a multiaxis electrochemical machine;
electrochemically machining in a first sequence a first row of blades in one stage of said blisk while mounted in said machine; and
electrochemically machining in a second sequence a second row of blades in another stage of said blisk while still mounted in said machine.
 2. A method according to claim 1 further comprising:
moving said blisk in a first direction into a first pair of electrode tools for electrochemical machining each of said first row blades; and
moving said blisk in a different second direction into a second pair of electrode tools for electrochemical machining each of said second row blades.
 3. A method according to claim 2 further comprising setting up said machine for machining said blisk by:
electrochemically machining in said machine sample blades in two stages of a tandem blisk sample;
removing said blisk sample from said machine;
inspecting said sample blades in said two stages of said blisk sample to determine dimensions thereof;
comparing said inspected dimensions with specified dimensions for said blisk;
repeating as necessary said setup sequence for said blisk sample until said inspected dimensions are within said specified dimensions; and
then mounting said blisk in said machine for sequentially machining said first and second rows of blades to said specified dimensions.
 4. A method according to claim 3 further comprising:
offsetting said second tool pair from said first tool pair in two different

planes relative to said blisk; and

translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

5. A method according to claim 3 further comprising:

translating each of said electrode tools in said first tool pair toward a respective one of said first row blades for electrochemical machining thereof; and

translating each of said electrode tools in said second tool pair toward a respective one of said second row blades without removing said blisk and tools from said machine.

6. A method according to claim 5 further comprising:

rotating said first tool pair as said blisk is moved in said first direction during electrochemical machining of each of said first row blades; and

rotating said second tool pair as said blisk is moved in said second direction during electrochemical machining of each of said second row blades.

7. A method according to claim 6 wherein:

said second row blades have different size and configuration than said first row blades;

said first tool pair are complementary with said first row blades for electrochemical machining thereof;

said second tool pair are complementary with said second row blades for electrochemical machining thereof; and

said second tool pair are translated and rotated upon translation of said blisk in said second direction in a manner corresponding with translation and rotation of said first tool pair as said blisk is translated in said first direction.

8. A method according to claim 7 further comprising:

offsetting said second tool pair from said first tool pair in two different

planes relative to said blisk; and

translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

9. A method according to claim 8 wherein said blisk sample is the same as said tandem blisk.

10. A method according to claim 8 wherein said blisk sample is a different part than said tandem blisk.

11. A machine for electrochemically machining a tandem blisk comprising:
a spindle for mounting said blisk;
means for electrochemically machining in a first sequence a first row of blades in one stage of said blisk while mounted in said machine; and
means for electrochemically machining in a second sequence a second row of blades in another stage of said blisk while still mounted in said machine.

12. A machine according to claim 11 further comprising:
means moving said blisk in a first direction into a first pair of electrode tools for electrochemical machining each of said first row blades; and
said moving means being configured for additionally moving said blisk in a different second direction into a second pair of electrode tools for electrochemical machining each of said second row blades.

13. A machine according to claim 12 wherein:
said second tool pair is offset from said first tool pair in two different planes relative to said blisk; and
further comprising means for translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

14. A machine according to claim 13 further comprising:

means for translating each of said electrode tools in said first tool pair toward a respective one of said first row blades for electrochemical machining thereof; and

means for translating each of said electrode tools in said second tool pair toward a respective one of said second row blades without removing said blisk and tools from said machine.

15. A machine according to claim 14 further comprising:

means for rotating said first tool pair as said blisk is moved in said first direction during electrochemical machining of each of said first row blades; and

means for rotating said second tool pair as said blisk is moved in said second direction during electrochemical machining of each of said second row blades.

16. A machine according to claim 15 wherein:

said second row blades have different size and configuration than said first row blades;

said first tool pair is complementary with said first row blades for electrochemical machining thereof;

said second tool pair is complementary with said second row blades for electrochemical machining thereof; and

said second tool pair is translatable and rotatable upon translation of said blisk in said second direction in a manner corresponding with translation and rotation of said first tool pair as said blisk is translated in said first direction.

17. A method of setting up said machine according to claim 12 comprising:

electrochemically machining in said machine sample blades in two stages of a tandem blisk sample;

removing said blisk sample from said machine;

inspecting said sample blades in said two stages of said blisk sample to

determine dimensions thereof;

comparing said inspected dimensions with specified dimensions for said blisk;

repeating as necessary said setup sequence for said blisk sample until said inspected dimensions are within said specified dimensions; and

then mounting said blisk in said machine for sequentially machining said first and second rows of blades to said specified dimensions.

18. A multiaxis machine for electrochemically machining a tandem blisk comprising:

a first pair of electrode tools for electrochemically machining in sequence a first row of blades in one stage of said blisk;

means for translating each of said tools in said first tool pair in corresponding first and second axes, and rotating said first tool pair in a third axis;

a second pair of electrode tools for electrochemically machining in sequence a second row of blades in another stage of said blisk;

means for translating each of said tools in said second tool pair in corresponding fourth and fifth axes, and rotating said second tool pair in a sixth axis; and

means for translating said blisk along a seventh axis in a first direction into said first tool pair for electrochemically machining each of said first row blades, and in an opposite second direction into said second tool pair for electrochemically machining each of said row blades.

19. A machine according to claim 18 further comprising:

means for rotating said blisk to sequentially position said blades thereof between said first pair of tools for electrochemical machining thereof, and between said second pair of tools for electrochemical machining thereof; and

means for translating said spindle along a longitudinal axis thereof to align said first blade row with said first tool pair, and to align said second blade

row with said second tool pair.

20. A method for electrochemically machining a tandem blisk in a single multiaxis machine comprising electrochemically machining in a first sequence a first row of blades in one stage of said blisk followed in turn by electrochemically machining in a second sequence a second row of blades in another stage of said blisk using corresponding electrode tools without removing said blisk from said machine between said two sequences, and without re-setting up said tools between said two sequences.